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Difference:

An account of Schön's "see-move-see" when designing within groups.

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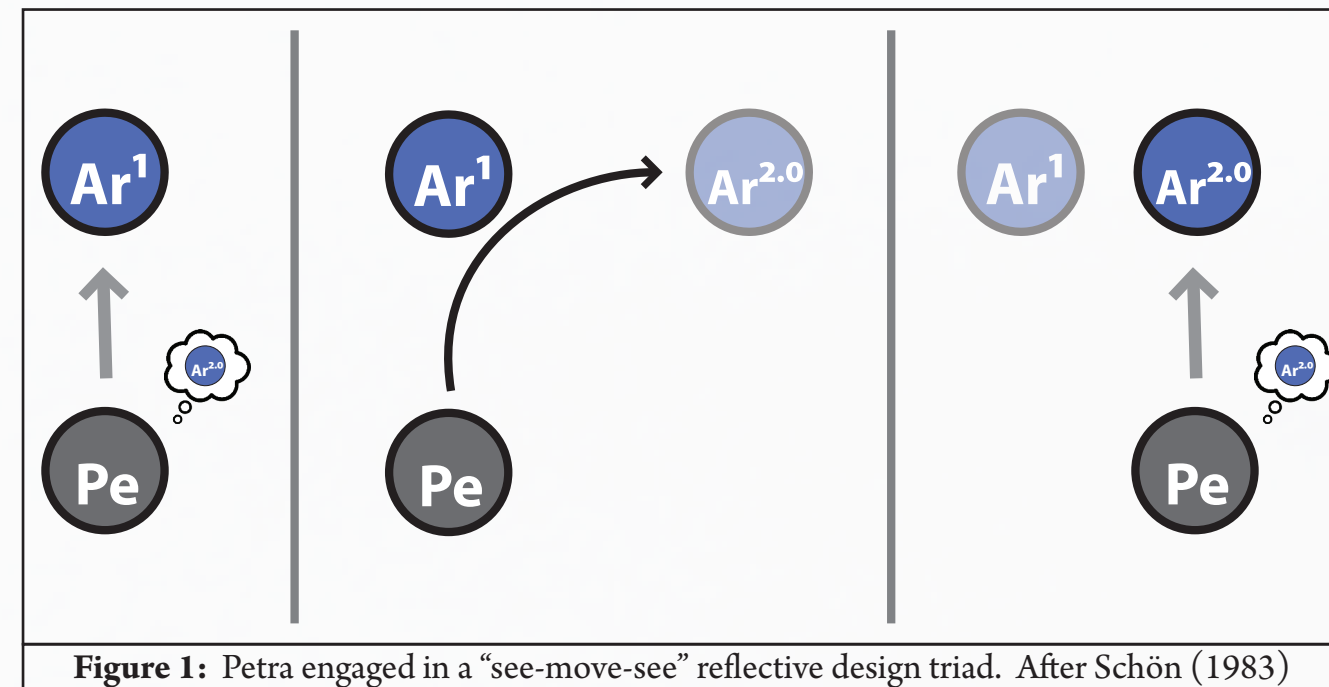


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Introduction

Schön (Schön, 1983) introduces us to Petra, a first year student working through a studio based architectural assignment, and Quist, the studio master engaging Petra in a set of tutorial sessions. Schön has analyzed this microcosm of design activity through the use of dialogue and drawings, which has resulted in the highly influential account of designing as a reflective practice, as a "conversation with the materials" where the designerly process is encapsulated as a "see-move-see" triad.



According to reflective practice, the designer "sees" the situation through their selected "frame", constructed by their "appreciative system", and comes to an assessment that the current situation is not preferred. A "move" is made, resulting in an attempt to re-construct the situation in a potentially preferable future state, which in Schön's account is evidenced as a modification to Petra's drawings. The final "see" is the reflective appreciation of the changes made, and an assessment by the designer about the proximity of the current situation to a more desirable outcome. For the past 30 years, this has provided an attractive account of design activity, situated around an individual designer.

This research project presents the interactions between two designers and two artifacts; a precedent object, and a constructed prototype. The two artifacts presented are operating as boundary objects (Star, 1989) across a design episode. Interactions are discussed in terms of a design trajectory, a teleological timeline that "...refers to a course of action but also embraces the interaction of multiple actors and contingencies that may be unanticipated and not entirely manageable" (Strauss, 1993). We frame the events within each interaction in terms of symbolic exchanges, where conversations, discourses and artifacts are exchanged and used to construct meaning across the design network (Oak, 2011), not only within the individual designer.

We pose the question :
"Before any move is made, who sees what?"

Various case studies were constructed, centred on the use of physical boundary objects during design activity, and ways in which they uncover difference between actors during design activity, which we suggest must be seen, identified and managed before any subsequent design move can be made.

Methods

An ethnomethodological approach informs our data collection activities, where we examine how two actors are using artifacts, dialogue and conversation to effectively outline and structure their worldview to others. As Gee suggests, actors select words, build phrases and construct sentences to suggest to others how they might re-construct their world view in the minds of others

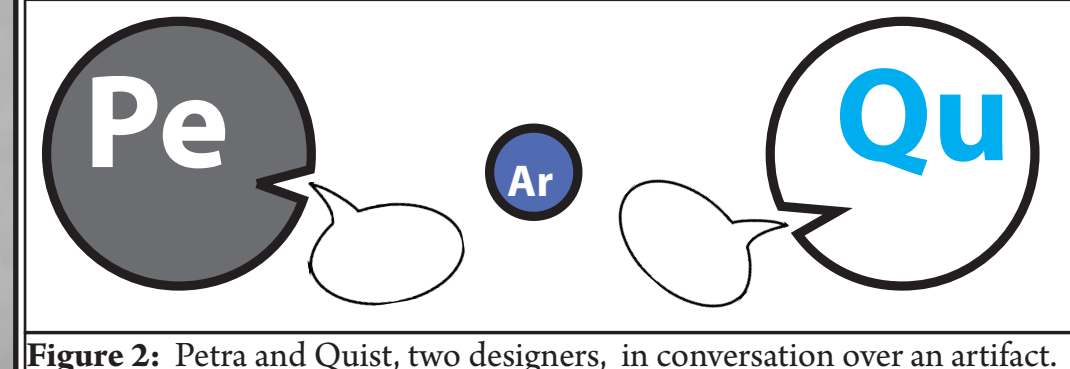


Figure 2: Petra and Quist, two designers, in conversation over an artifact.

(Gee, 2011:71). Accordingly, we have used a **mixed methods approach**, involving *discourse analysis*, *visual image analysis* and *descriptive ethnographic accounts*, to understand how physical boundary objects facilitate interactions between designer's exchanging world views.

Over the course of one semester, we engaged 12 postgraduate product design students involved in individual design briefs, created from independent research projects from a previous semester. Data collection involved recording tutorial discussions over and about constructed artifacts. These were held in the studio environment, intending to maintain a more natural encounter between participants involved. Photographs of artifacts presented were taken during each session, as part of the inventory of each tutorial episode. All tutorials were 30 minutes in length, once per week, over an eleven week period. All audio recordings were transcribed in preparation for analysis.

A coding scheme was developed and tested for intercoder reliability, to test our working hypothesis that physical boundary objects structure *difference* between designers, when the presentation of artifacts in design episodes is understood as being one component of the design conversation, understood as a representational system of symbolic exchange across the network of actors (Currie, 2004).

Literature Cited

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Analysis of Results

Analysis of tutorial transcripts identified three worlds of focus in the conversations between tutor and students across each design episode: *material composition* (what is the object made from?), *technical process* (what is the object made with?) and *social interaction* (what is the object made for?). During each episode, the boundary objects presented are also operating across multiple trajectories, constructed from the experiences and appreciative judgement systems of the participants, as designers discuss the relationships between precedent artifacts, present prototypes and future manifestations yet to appear.

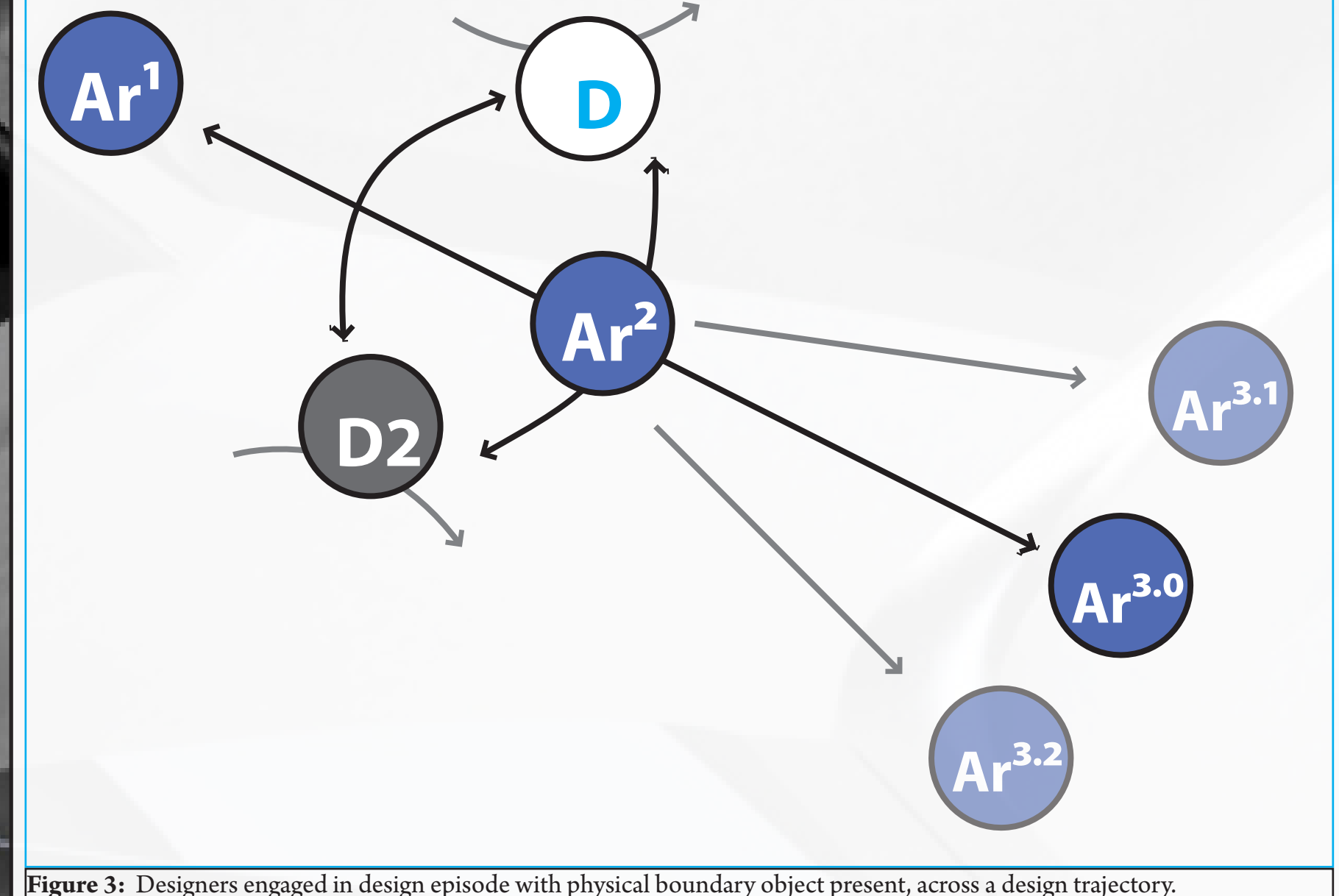


Figure 3: Designers engaged in design episode with physical boundary object present, across a design trajectory.

Difference is apparent in numerous episodes that the actors are engaged in. At one level, designers are attempting to resolve differences within worlds; that is, selecting from their individual systems of appreciation from *within* these respective worlds;

Future Considerations

The prototypes and artifacts presented during tutorial discussions, when operating as boundary objects between actors across the design network, do not necessarily construct shared thinking and understanding; rather, they appear to operate as a concrete point which highlights difference across worlds, enabling a re-structuring of individual views towards a common

discussions from one case study was centred in the *material* world, as designers discussed a type of plastic to be used in future design production. Difference also occurs *across* these three worlds; again, discussions involving production with plastic in the *material* world were shown to have an impact upon the *technical* world, since different plastics require different technical processes for fabrication. Again, referencing from our particular case study, designers were witnessed discussing the different properties of various plastics, which enable this material to operate, function or perform in different ways, and required the designers to manage difference across *social* worlds.

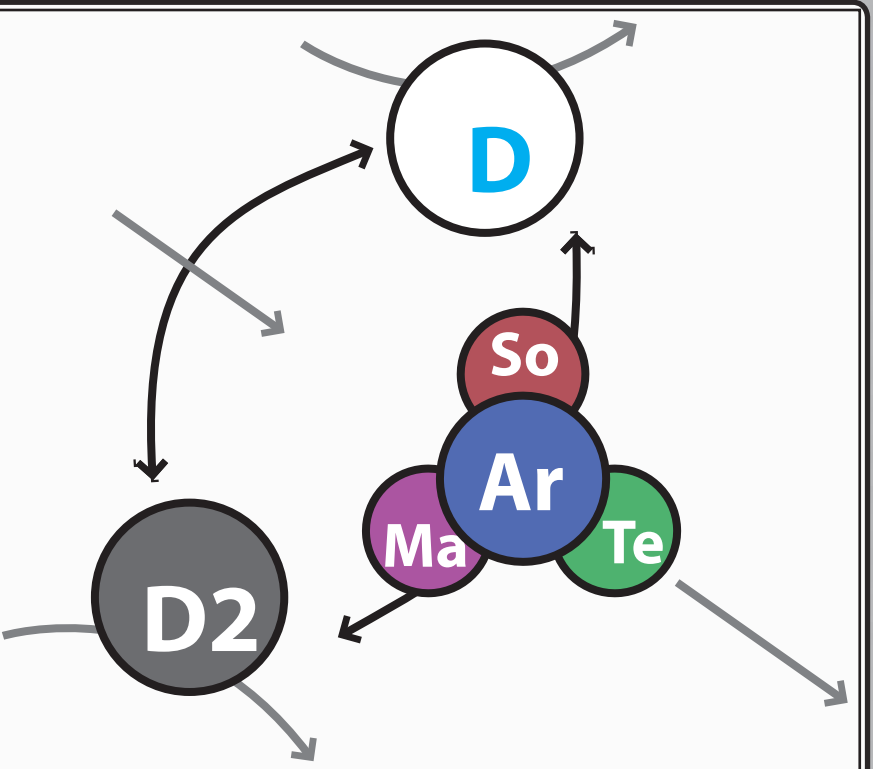


Figure 4: Designers in an episode, engaged with a physical boundary object which spans material, technical and social worlds. Difference emerges both within and across worlds.

During the tutorial episodes, references were also identified in transcripts that established difference across the design trajectory, creating two types of temporal difference; namely *difference of intention*, and *difference of interpretation*. Difference of intention is outlined as being the multiple views present in the network regarding what the *subsequent move should be*. It was identified as the range of moves possible, derived from an understanding of the boundary objects presented, in a temporal relationship with various future iterations of the prototype. From figure 3, we suggest that difference of intention is defined as the pathway from **AR²** towards **AR^{3.n}**. Difference of interpretation, more retrospective in nature, was identified as being the multiple views present in the network regarding what *the precedent moves have been*. From figure 3, we outline this as the pathway from **AR²** towards **AR¹**.

Discussions in our case studies between designers with artifacts highlighted that *difference of intention* and *difference of interpretation* were seen to take place across temporal pathways in the trajectory, both *within* worlds (i.e. materials), and also *across* worlds. We documented various conversations in our study, where precedent material, *interpreted* differently, led to differing *intentions*, ultimately creating difference between designers with regards to iterations in future technical and/or social worlds.

through the presentation of physical artifacts during design episodes, it remains unclear whether physical artifacts facilitate convergent or divergent modes of thinking in designers, and to what degree low vs high fidelity prototypes facilitate appropriate thinking at various stages of design development. Future research will investigate relationships between drawing/sketching (hi plastic boundary objects) and making/prototyping (lo plastic boundary objects), including the difference between these forms of representational artifacts and the ways they operate differently in structuring designers' thinking, particularly in diverse groups and networks.

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Further Information

For additional information regarding this research, the case studies presented, or the PhD project overall, please contact the corresponding author at: a.verhoeven@ed.ac.uk.